

STUDIES IN THE LAURACEAE, V  
SOME EASTERN ASIATIC SPECIES OF BEILSCHMIEDIA AND  
RELATED GENERA.

CAROLINE K. ALLEN

A LARGE portion of the eastern Asiatic species of *Beilschmiedia* and *Cryptocarya* from the herbaria of the Arnold Arboretum, Gray, and New York Botanical Garden has been on loan to Dr. Kostermans for several years. As there is no immediate prospect of its return, it has seemed advisable to gather together such material as is available at present and to attempt to place the mass of Chinese specimens from recent collections. The intention of this paper, therefore, is not to present a complete study of the genera involved but rather to make usable what specimens we have. Originally *Beilschmiedia*, *Cryptocarya* and *Endiandra* only were to be considered, but on detailed study it proved desirable to propose a new combination in *Dehaasia* and a new genus, *Lauromerrillia*. *Cryptocarya* yielded a Chinese representative of the Indian genus *Syndiclis*. It goes without saying that in all probability some revision will be necessary when type material is available.

The following key will separate roughly the genera below. Unfortunately, it is almost always imperative that flowering specimens be at hand.

Flower parts in threes or multiple of threes

Fertile stamens 9

Leaves subverticillate in clusters at branchlet tips; branchlets conspicuously pale grey; flowers few with perianth lobes often unequal, borne on long slender pedicels; fruit subtended by expanded claviform pedicels. . . . . *Dehaasia*.

Leaves not subverticillate; branchlets not conspicuously pale grey; flowers numerous with perianth lobes equal or subequal, borne on short pedicels; fruit subtended by pedicels symmetrically enlarged

Leaves usually conspicuously reticulate; flowers with perianth tubes absent or very shallow; fruit not costate. . . . . *Beilschmiedia*.

Leaves usually not reticulate or very minutely so; flowers with perianth tube equalling the lobes in length; fruit conspicuously costate, at least in young stages . . . . . *Cryptocarya*.

Fertile stamens 6; 6 glands alternate with perianth lobes. . . . . *Lauromerrillia*.

Fertile stamens 3. . . . . *Endiandra*.

Flower parts in twos or multiple of twos; fertile stamens 4. . . . . *Syndiclis*.

The following letters are used to indicate the institutions in which the numbers cited are to be found: Arnold Arboretum (AA); Philippine Bureau of Science, Manila (M); New York Botanical Garden (NY); Jardin des Plantes, Paris (P); United States National Arboretum (Department of Agriculture) (USDA); United States National Herbarium (USNH); Vienna Botanical Garden (V).

**Dehaasia** Bl.**Dehaasia Cairocan** (Vidal), comb. nov.

*Beilschmiedia Cairocan* Vidal, Rev. Pl. Vasc. Filip. 223. 1886; Ceron, Cat. Pl. Herb. Manila 124, 1892; Merrill, Enum. Philip. Pl. 2: 198. 1923.

*Haasia borneensis* Meissn. in DC. Prodr. 15<sup>1</sup>: 61. 1864.

*Dehaasia borneensis* F.-Vill., Nov. Append. 179. 1880. Non B. & H.

*Beilschmiedia spec.* Vidal, Sinops. 10, t. 78, F. 1883.

PHILIPPINE ISLANDS: *Ahern* 130 (USNH); *Barros* 17902 (USNH); *Belen* 23331 (AA, USNH); *Bernardo* 13113 (USNH); 15239 (AA); 17918 (USNH); *Curran* 10384, 10392 (USNH); *Franco* 21937 (USNH), 27791 (AA, USNH); *Klemme* 6643, 7125 (USNH); *Merrill* 2599 (USNH); *Paraiso* 19740 (USNH); *Ramos* 1075 (USNH); *Rosenbluth* 12807 (USNH); *Wenzel* 1238 (AA); *Whitford* 1683 (USNH).

HAINAN: *Lau* 538 (AA, NY, USDA, USNH, V), 1610 (AA, NY).

From the literature cited above one learns that both Meissner and Vidal had only fruiting material on which to base the species under discussion, and, if one may judge from Vidal's plate, that fruit was not fully mature. The fruit of the material cited from the Philippines appears typical of the genus *Dehaasia*. The long pedicel is inflated somewhat more at the apex than at its base and is usually as long as the fruit which it subtends. The flowering specimens show the typical slender panicles bearing flowers with unequal perianth lobes, the outer three being less than one half the length of the inner, and somewhat scale-like. All of the specimens resemble other members of the genus in their greyish twigs at once striate and roughened with leaf scars and the numerous oblanceolate or narrowly obovate long-petioled leaves borne in dense whorls at the tips of the branchlets. The Hainan numbers cited show precisely the same characteristics as those from the Philippines with the exception of the flowers which have perianth lobes of equal size.

A word should be added regarding the names *Haasia* and *Dehaasia*. *Dehaasia* was described by Blume in Rumphia, 1: 161. 1835, in honor of Dirk de Haas. Blume states clearly that in the Dutch language "de" and "van" are so closely connected with the family name that one can not take the liberty of separating them unless the resulting name should be discordant or too long and unwieldy. Nees (Syst. Laurin. 372. 1836) uses *Haasia*, giving in a foot note, presumably a quotation, Blume's statement concerning the origin of the generic name, but Nees misquotes and omits the reasons so clearly stated by Blume. There is no alternative but to accept Blume's earlier spelling of the name.

**Beilschmiedia** Nees

**Beilschmiedia Fordii** Dunn in Jour. Bot. 45: 404. 1907; Chun in Contr. Biol. Lab. Sci. Soc. China 1<sup>5</sup>: 9. 1925; Liou, Laurac. Chine Indoch. 105. 1932.

HONGKONG: *Ford* (fragm. type, AA); *W.J.T.* (*Hongkong Herb. No. 9051?*) (AA); *W.J.T.* (*Hongkong Herb. No. 5223*) (AA). KWANGTUNG: *Lau* 1980, 2524, 2798 (AA); *To, Tsang & Tsang* 620 (*CCC No. 12620*) (AA, USDA, USNH); *Tsang* 21128 (USDA), 21130 (AA, NY), 21268 (AA, NY, USDA).

This species is characterized by heavily coriaceous, oblong, shining leaves. I have seen no flowering specimens, but Dunn describes the flowers as occurring in axillary cymes 2-3 cm. long, with thick peduncles

1 cm. long. The smooth, bluish black, ellipsoid fruits, frequently covered with a frosty bloom, are borne on enlarged pedicels in short subterminal or axillary infructescences. *Number 5223* from Happy Valley, the type locality, shows leaves with the nervation obscure on the upper surface, except for the impressed costa, and less so on the lower surface with the costa very prominent.

**Beilschmiedia brevipaniculata**, spec. nov.

Arbor 3–7 m. alta, ramulis glabris, novellis leviter papillois, teretibus leviter striatis plus minusve nitidis rubro-brunneis. Folia opposita vel subopposita, lanceolata, 4–8 cm. longa, 1–2.8 cm. lata, coriacea, obtuse subacuminata saepe falcata, basi cuneata, utrinque glabra supra interdum nitida, in sicco brunnescentia, subtus laxe prominenter reticulata, penninervia, nervis lateralibus 4–6 (?) obscuris supra haud conspicuis subtus leviter elevatis, petiolis sat robustis ad 1.5 cm. longis, glabris. Inflorescentia terminalia raro axillaris brevipaniculata plus minusve 1 cm. longa (post anthesin longiora?) glabra, pauciflora, pedunculis 2–3 mm. longis. Flores  $\pm$  1 mm. longi, pallide flavi (fide coll.), glabri, perianthii lobis ovatis  $\pm$  1.7 mm. longis dense glanduloso-punctatis, tubo 0.8 mm. longo, pedicellis 0.5 mm. longis. Fructus nigrescens (fide coll.), in sicco brunnescens, opacus, glaber, dense minute conspicueque tuberculatus, ellipsoideus, apiculatus,  $1.7 \times 1.1$  cm., calyce plus minusve deciduo reliquo subtentus, pedicellis incrassatis ad 1 cm. longis et 2.5 mm. crassis glabris.

KWANGSI: Shap Man Taai Shan, near Iu Shan Village, southeast of Shang-sze, Kwangtung Border (Shang-sze District) *Tsang 22418* (TYPE fl., AA) fairly common in thicket on steep rocky slope, June 4, 1933 (tree 3 m., fl. pale yellow); *Tsang 24350* (fruit, AA), *22402* (AA). HAINAN: *Lau 27302, 27305, 28227* (AA).

This species is more nearly related to *B. Fordii* Dunn from Hongkong than any other. The upper surface of the leaves is frequently shining and of a thick waxy texture such as is found in *B. Fordii*. The lanceolate leaves of *B. brevipaniculata*, however, are much smaller, not more than 8 cm. in length, the panicle shorter and the fruit tuberculate instead of smooth. Tuberculate fruit is characteristic of *B. Tsangii*, but the more membranous leaves and the very prominently and closely reticulate upper leaf surface easily separate the latter. The new genus *Lauromerrillia*, described later in this paper, has fruit which is tuberculate, although less conspicuously so than that of *B. brevipaniculata*.

**Beilschmiedia laevis**, spec. nov.

Arbor (7–)10(–15) m. alta, ramulis glabris teretibus striatis, novellis saepe sulcatis, olivaceis robustis. Folia opposita vel subopposita, elliptica vel oblonga, ad 10(–11) cm. longa, 4–6 cm. lata, percoriacea, breviter obtuse acuminata, basi acuta, sat undulata, utrinque glabra, supra nitida, in sicco castanea, supra laxe crasseque subtus graciliter reticulata, penninervia, nervis ad 6 utrinque leviter elevatis, costa supra impressa subtus elevata, petiolis ad 2 cm. longis glabris robustis. Inflorescentia ignota. Infructescencia subterminalis, brevis, glaber, ad 4 cm. longa. Fructus brunnescens, glaber, ellipsoideus, apiculatus, ad  $1.7 \times 1.2$  cm. ( $2.5 \times 2$  cm.), pedicellis pedunculis confusis incrassatis, ad 2 cm. longis et 4 mm. crassis.

HAINAN: *Liang 64997* (TYPE fruit, AA; USNH) in shaded forest on mountain side,

Feb. 20, 1934 (tree 10 m. or more high; diam. 2/3 m.), 62018 (AA, USNH), 62603 (AA), 63377 (AA); *Lau* 3839 (AA); *Wang* 33228 (AA).

This species has been referred to *B. assamica* Meissn. but differs in its proportionately wider, elliptic leaves with longer petioles and the elliptic, very smooth, reddish (in herbarium specimen) fruit. It would seem that a character as consistent as the castaneous color of the leaves on drying and their always undulate margin would have been noted by Meissner had it been apparent in *B. assamica*. With *B. laevis* we are getting on the fringe of the troublesome *B. erythrophloia* Hayata, although the two species could never be confused. Again, there is no flowering specimen available, but the outstanding leaf and fruit characters indicate a new species.

**Beilschmiedia yunnanensis** Hu in Bull. Fan. Mem. Inst. Biol. 5: 306. 1934.

YUNNAN: *Tsai* 51834 (ISOTYPE fl., AA), 51697, 55013 (AA). TONKIN: *Fenzel* 27 (V).

*Beilschmiedia yunnanensis* possesses a leaf character unusual for the genus. The leaf surface is alveolate, a much finer condition than is habitually found. The flowers are typical of the genus. As yet, no fruiting material has been noted.

**Beilschmiedia robusta**, spec. nov.

Arbor 10–15 m. alta, ramulis glabris teretibus striatis griseis, novellis breviter sulcatis rubro-brunnescentibus. Folia opposita vel subopposita, lanceolata vel elliptica ad 10 cm. longa,  $\pm$  4 cm. lata, coriacea, obtusa vel acuta, basi cuneata, utrinque glabra, supra quam subtus sat nitidior, dense minuteque glanduloso-punctata, utrinque supra laxe subtus dense reticulata, penninervia, nervis lateralibus 9–12 supra obscuris subtus leviter conspicuis, petiolis ad 1.5 cm. longis leviter atratis. Inflorescentia axillaris et subterminalis, probabiliter paniculata, brevis, minusquam 2 cm. longa, glabra, pauciflora. Flores ad 3 mm. longi, sparse conspicueque glanduloso-punctati, virides (fide coll.), glabri, perianthii lobis ovatis 1.9 mm. longis. Fructus viridis (fide coll.), in sicco brunnescens et crasse rugosus, glaber, obovoideus vel subturbinatus, ad 3  $\times$  2.5 cm., pedicellis ad 1 cm. longis 5 mm. crassis in sicco ferrugineis et aciculatis glabris.

YUNNAN: You-louh shan, Che-li, *Wang* 78157 (TYPE fl., AA) alt. 1415 m., thickets, Sept. 1936 (10 m. high, dbh. 0.6 m.; flower green), *Wang* 74395, 74491, 74759, 75303, 75363, 76785, 76805, 77074, 77384, 78238 (AA); *Yü* 16505 (fruit, AA), 18159 (AA); *Henry* 12777 (AA).

The specimens cited above have been determined as *B. erythrophloia* Hay. but are easily distinguished from the Formosan species by the more numerous veins, the coarser reticulation on the upper leaf surface, the larger, very fleshy obovoid or subturbinate fruit, and the broader less long-acuminate buds. As far as may be ascertained, *B. erythrophloia* Hay.<sup>1</sup> does not occur in China, although for years it has been credited to Yunnan and Hainan. *Beilschmiedia erythrophloia* has oblong, ovate-

<sup>1</sup> *Beilschmiedia erythrophloia* Hayata, Ic. Pl. Formos. 4: 20. 1914; Chun in Contr. Biol. Lab. Sci. Soc. China 1<sup>5</sup>: 8. 1925; Hu, Wang & Hsia in Bull. Fan Mem. Inst. Bot. 8: 335. 1938.

oblong, ovate-lanceolate, or elliptic, long-petioled leaves up to  $9 \times 4.5$  cm., according to the description, only slightly obtusely acuminate and prominently but closely reticulate. The fruit is obovoid,  $2 \times 1.2$  cm., shining, rounded at the apex, obtuse at the base, with the pedicel scarcely enlarged. The specimens so labeled in the herbarium of the Arnold Arboretum differ from the description in having foliose branchlets bearing leaves not more than 6 cm. long, with only the suggestion of an obtuse acumen, a pedicel somewhat enlarged, and fruit rather pointed at the apex. This species has also been confused with *B. assamica* Meissn., from which it is easily separable by the smaller, lanceolate-elliptic leaves, not acuminate, with more obscure and more numerous, less arcuate lateral nerves and by the obovoid subturbinate fruit.

***Beilschmiedia intermedia***, spec. nov.

Arbor ad 15 m. alta, ramulis glabris teretibus striatis, novellis leviter sulcatis, brunnescentibus saepe mox griseis. Folia opposita vel subopposita, elliptica 8.5 cm. longa, 4 cm. lata, coriacea, obtusa vel obtuse leviter subacuminata, basi cuneata, utrinque glabra, interdum in sicco pallide griseo-viridescens, subtus brunnescentia, utrinque laxe reticulata, penninervia, nervis  $\pm 7$ , leviter obscuris, petiolis ad 1.5 cm. longis brunnescentibus glabris. Inflorescentia axillaris, paniculata, brevis, ad 1.5 cm. longa, glabra, pauciflora. Flores  $\pm 2$  mm. longi, viridescenti-albi (fide coll.), glabri, perianthii lobis ellipticis 2 mm. longis dense conspicueque glanduloso-punctatis, marginibus scariosis, pedicellis ad 1.5 mm. longis glabris. Fructus in sicco brunnescens, glaber, minutissime tuberculatus, ellipsoideus, apiculatus,  $3 \times 1.5$  cm., pedicellis incrassatis ad 1.5 cm. longis 4 mm. crassis, in sicco brunnescentibus aciculatis, glabris.

HAINAN: Yaichow, *Liang* 63217 (TYPE fl., AA) in dense shade in mixed woods, Oct. 14, 1933 (tree 12–15 m., diam. 1.5 m.; fl. green-white; fr. green), *Liang* 63324 (fruit, AA), 63409, 63429 (AA); *Lau* 5072 (AA); *McClure* (CCC No. 8158) (AA, USDA); *Wang* 34330 (AA).

*Beilschmiedia intermedia* is similar to *B. discolor*, but varies in fruit characters. It is possible that with more available material and closer attention to its collection in the field, this species may prove to be an intergrading form. The fruit is less pointed at the ends, more oblong than ellipsoid, and is borne on pedicels that are much more swollen.

***Beilschmiedia discolor***, spec. nov.

Arbor (5–)9(–20) m. alta, ramulis glabris, novellis subglaucis teretibus sat striatis brunnescentibus mox griseis. Folia opposita vel subopposita, elliptica vel lanceolato-elliptica, ad 8.5 cm. longa, 3.5 cm. lata, coriacea, obtuse vel obtuse-acuminata, basi cuneata, utrinque glabra, supra lustro-viridis (fide coll.), in sicco plus minusve nitida, pallide griseo-viridescens, subtus brunnescentia, utrinque reticulata, penninervi, nervis lateralibus 6–8, petiolis 1(–1.5) cm. longis glabris brunnescentibus. Inflorescentia ignota. Infructescentia axillaris, paniculata, brevis ad 2 cm. longa, glabra, pauciflora, pedunculis ad 1 cm. longis. Fructus lustro-viridis (fide coll.), in sicco atro-rubescens, glaber, minutissime tuberculatus, anguste ellipsoideus, utrinque sat attenuatus,  $1.8 \times 0.8$  cm., pedicellis leviter incrassatis ad 7 mm. longis et 2 mm. crassis brunnescentibus glabris.

HAINAN: Po-ting, *How* 73571 (TYPE fruit, AA), alt. 420 m., in forest, Aug. 31, 1935 (tree 9 m. high, bark brown; leaves lustrous green, coriaceous; fruit lustrous green); *How* 73719 (AA); *Lau* 406 (AA, USDA, USNH), 3806 (AA); *Liang* 64084 (AA), 64900, 65055 (AA, USNH), 65158 (AA); *Wang* 33551 (AA, USNH), 36846 (AA).

As mentioned before, the true *B. erythrophloia* Hay. apparently does not occur in China. The species nearest the latter is *B. discolor*, which differs in having pale leaves grey-green above and brownish below on drying. The branchlets are not as leafy as those of the sheets labeled *B. erythrophloia*. The fruit is more pointed at each end and the pedicels are distinctly more thickened than those of the latter.

***Beilschmiedia grandiosa*, spec. nov.**

Arbor ad 25 m. + alta, cortice purpureo-rubro (fide coll.), ramulis glabris teretibus striatis brunnescentibus mox griseis. Folia opposita vel subopposita, elliptica vel lanceolata, 6.5(-10) cm. longa, 2.5(-6) cm. lata, coriacea, obtusa vel obtuse acuminata, cuneata, utrinque glabra supra in sicco interdum nitida, pallide griseo-viridescens, subtus brunnescentia, utrinque reticulata, penninervia, nervis  $\pm 7$ , petiolis 1(-1.5) cm. longis glabris brunnescentibus. Inflorescentia ignota. Fructus nigrescens (fide coll.), in sicco brunnescens, glaber, minutissime tuberculatus, ellipsoideus, utrinque leviter attenuatus, apiculatus,  $4 \times 2$  cm., pedicellis incrassatis ad  $\pm 1$  cm. longis et  $\pm 4$  mm. crassis brunnescentibus aciculatis glabris.

HAINAN: Yaichow, *Liang* 63142 (TYPE fruit, AA) shaded and mixed forests up mt., Sept. 26, 1933 (tall tree spreading 25 m. plus high, diam. 2-3 m.; bark purple-red; fr. black); *Liang* 63215 (AA, USNH); *How* 73139 (AA); *Lau* 25462 (AA).

The two sheets of *Liang* 63215 have fruit which looks rather abnormal, certainly less symmetrical than that of the type, and more attenuated at the ends. It may be another form of the same complex, or it may be an abnormality due to insect attack. *Beilschmiedia grandiosa* represents the largest fruited group of plants in what may be termed the *B. erythrophloia*-complex in China. The elliptic or lanceolate, coriaceous leaves are often up to 11 cm. in length. The minutely tuberculate fruits are ellipsoid, up to  $4 \times 2$  cm., and are borne on enlarged pedicels up to 6 mm. in diameter.

These last three proposed species are difficult to separate from one another, all having similar characteristics generally and the same loose reticulation apparent on both surfaces of the leaves. The season of collection seemingly means little, for with the exception of *B. intermedia*, of which we have specimens only from October through December, fruit seems to have been collected in nearly every month of the year.

***Beilschmiedia pergamentacea*, spec. nov.**

Arbor 8-14 m. alta, ramulis glabris minute glandulosis teretibus striatis cicatricosis, sat atro-rubrescentibus. Folia opposita vel subopposita, lanceolata, (6-)11-15(-17) cm. longa, (1.5-)3(-4) cm. lata, pergamentacea, acuminata vel obtuse acuminata, basi attenuate cuneata, utrinque glabra, in sicco supra pallida, griseo-viridescens, subtus viridescens, clarior, minute denseque glanduloso-punctata, supra obscure subtus conspicuore reticulata, penninervia, nervis 8-12, supra leviter elevatis sat obscuris subtus et costa elevatis rubrescentibus, petiolis ad 2 cm. longis glabris atro-rubrescentibus.

Inflorescentia ignota. Infructescentia axillaris, robusta, glabra, ad 10 cm. longa, fructu unico maturante. Fructus nigrescens, glaber, ellipsoideus, mucronulatus, ad  $3.5 \times 2.3$  cm., pedicellis pedunculis confusis incrassatis clavatis striatis brunnescentibus ad 4 cm. longis et summis 6 mm. crassis.

HAINAN: Fan Yah, *Chun & Tso* 44247 (TYPE fruit, AA, USNH), alt. 1220 m., in forested ravine (tree 8 m., diam. 20 cm.); *Chun & Tso* 44015 (AA), 44122 (AA, USNH); *Lau* 26359 (AA); *Tang* 409 (AA).

The species with its lanceolate leaves, somewhat paler above and with venation prominent and reddish below, appears to be near *B. Poilanei* Liou from Indochina. The shorter inflorescence, with peduncle and pedicel merging into a robust clavate structure subtending the smooth ellipsoid fruit, separates it from the latter. These striking characters warrant description on fruiting specimens alone.

**Beilschmiedia longepetiolata**, spec. nov.

Arbor ad 20 m. alta, ramulis glabris teretibus striatis fulvo-brunnescentibus mox atratis vel griseis maculatis. Folia opposita vel alternata, lanceolata, elliptica vel oblanceolata, anguste obovata, (3-)6-12 cm. longa, (1.2-)3-4(-5) cm. lata, percoriacea, rotundata, saepe obtusa, basi attenuata cuneata, saepe undulata, utrinque glabra, supra nitida, subtus pallida, utrinque laxe, crasse prominenterque reticulata, penninervia, nervis lateralibus  $\pm 6$  utrinque elevatis, costa supra leviter subtus prominenter elevata, petiolis 1.5-2.5 cm. longis glabris supra planis. Inflorescentia subterminalis paniculata, ad 3 cm. longa, glabra, pauciflora, pedunculis ad 1.5 cm. longis nigrescentibus. Flores  $\pm 3.5$  mm. longi, albo-flavi (fide coll.), glabri, perianthii lobis ellipticis  $\pm 2.5$  mm. longis prominenter glanduloso-punctatis ciliolatis, pedicellis ad 5 mm. longis glabris. Fructus atro-virens (fide coll.), in sicco atratus, glaber, in sicco minute rugosus, ellipsoideus,  $3 \times 2$  cm., pedicello incrassato ad 8 mm. longo, basi 4 apice 6 mm. crasso atrato glabro.

HAINAN: *Wang* 34640 (TYPE fl., AA) in mixed woods, Oct. 16, 1933 (tree 20 m. high; fl. white-yellow), *How* 71018 (fruit AA, USNH).

*Wang* 34640 at one time was pronounced to be a flowering specimen of *B. obovalifolia* Lct. from Indochina, but it differs from the description of that species in the following characters: the branchlets are pale reddish brown, later becoming greyish or darkened by reddish black blotches; the leaves are larger with nerves almost obscured by the very coarse, loose, prominent reticulation above and below; the petiole is not less than 1.5 cm. long and flat above. The fruit of *B. longepetiolata* is much larger, not obovoid as far as can be ascertained from the one crushed fruit on the specimen, and borne on a pedicel decidedly enlarged. There is no doubt, however, that the species is very close to *B. obovalifolia*. Another relative is *B. percoriacea* which differs in having reddish black young branchlets, larger leaves, shortly, obtusely acuminate, proportionately broader, more numerous, arcuate lateral nerves, blackish petioles, and ellipsoid fruit,  $4.5 \times 1.5$  cm.

**Beilschmiedia percoriacea**, spec. nov.

Arbor, ramulis glabris teretibus ad nodos leviter complanatis striatis atro-rubrescentibus mox griseis. Folia opposita vel alternata, oblonga vel elliptica,

(9–)15 cm. longa, 4.5–6 cm. lata, percoriacea, breviter obtuse acuminata, basi cuneata, undulata, utrinque glabra, supra nitida, glanduloso-punctata, utrinque reticulata, penninervia, nervis 6–8 utrinque elevatis supra quam subtus conspicuioribus, costa supra leviter impressa subtus elevata, petiolis robustis ad 2 cm. longis sat canaliculatis glabris atratis. Inflorescentia ignota. Infructescentia axillaris, ad 4.5 cm. longa, glabra. Fructus lucido-viridis (fide coll.), in sicco nigrescens, laevis, ellipsoideus, saepe obliqua, ad  $4.5 \times 1.5$  cm., pedicellis incrassatis ad 5 mm. longis et 4 mm. crassis glabris.

HAINAN: Po-ting, *How* 72964 (TYPE, young fruit, AA) alt. 840 m., in forest, June 21, 1935 (tree 7 m., bark brown; leaf deep green above, pale beneath, lustrous, coriaceous; fruit lustrous green); *How* 73523 (more mature fruit, AA); *Lau* 3612 (AA); *Liang* 63115 (AA). KWANGSI: *Ching* 8286 (V).

This species has the heavily coriaceous leaves of *B. longepetiolata* from Hainan but differs as has been noted under the latter. It is this leaf character which separates *B. percoriacea* from *B. Roxburghiana* Nees as well. Although no flowers are available, the leaf and fruit characters of the species seem to be sufficiently outstanding to warrant description. Possibly here belongs *Ford* 4 from Hongkong, Victoria Peak, 15 Aug. 1881, which has been referred to *B. jagifolia* Nees from Sylhet. Only a scanty leaf fragment is at hand, but it is probable that this is the proper identification. The species *B. jagifolia* has also been referred to *B. Roxburghiana* Nees. Liou separates *B. jagifolia* in his key on the smaller size of the leaf and the presence of a less stout petiole.

**Beilschmiedia Roxburghiana** Nees in Wallich, Pl. As. Rar. **2**: 69. 1831; Chun in Contr. Biol. Lab. Sci. Soc. China **15**: 8. 1925; Liou, Laurac. Chine Indoch. 110. 1932.

HAINAN: *Fung* 20123 (AA, USDA, USNH); *Lau* 3147, 27404 (AA).

These specimens agree fairly well with the description and photograph of the type but are all in fruit. I am inclined to think that a new species may be involved and that the above species does not occur in China. Until flowering specimens are collected, these numbers will be kept under *B. Roxburghiana*.

**Beilschmiedia atrata**, spec. nov.

Arbor ad 9 m. alta, ramulis glabris plus minusve teretibus striatis atro-rubrescentibus mox griseis. Folia opposita vel subopposita, elliptica, 8–13 cm. longa, 3–5.5 cm. lata, subcoriacea, obtuse acuminata, basi cuneata, margine undulata, utrinque glabra, supra nitida in sicco rubescenti-brunnea, minute glanduloso-punctata, utrinque obscure, laxe graciliterque reticulata, penninervia, nervis 9–11 costaque subtus elevatis, petiolis ad 1.5 cm. longis glabris. Inflorescentia axillaris, paniculata, brevis, ad 3 cm. longa, glabrescens, 5-flora, pedunculis ad 1 cm. longis. Flores 1.5 mm. longi, flavi (fide coll.), glabrescentes, perianthii lobis  $\pm 2$  mm. extus sparse intus dense canescenti-pubescentibus orbicularibus, pedicellis brevibus ad 5 mm. longis. Fructus viridescens (fide coll.), in sicco atro-rubescens, glaber, sat laevis, ellipsoideus, interdum apiculatis,  $3 \times 2$  cm., pedicellis ad 1 cm. longis et 4–5 mm. crassis glabris.

HAINAN: Hung Mo Shan & vicinity, Lai (Loi) area, *Tsang & Fung* 693 (*L. U.* 18227) (TYPE fl. & fruit, AA; USNH, V), at top of mt. in forest, Aug. 12, 1929 (tree 9 m. high, diam. 12 cm.; fl. yellow; fr. green).



This seems at first to be very near *B. Roxburghiana*, but is separated by the smaller leaves with more obscure reticulation, the absence of a whitish tomentellous condition on the racemes and young branchlets, the elliptic ( $3 \times 2$  cm.) instead of oblong ( $4 \times 1.5$  cm.) fruit. The subcoriaceous leaves as well as the young branchlets of this species in the dried state are blackish red and the leaves are shining above.

**Beilschmiedia Wangii**, spec. nov.

Arbor ad 7 m. alta, ramulis glabris summis glabrescentibus (probabiliter novellis pubescentibus) teretibus striatis rubro-brunnescentibus mox atro-rubrescentibus. Folia oblonga vel oblongo-elliptica, 9(-23) cm. longa, 3.5 (-8) cm. lata, membranacea vel subcoriacea, obtuse subacuminata, basi acuta saepe obliqua, supra glabra, saepe nitida, supra nitida, subtus pubescentia, minute denseque glanduloso-punctata, plus minusve minute papillosa, supra leviter subtus conspicue reticulata, penninervia, nervis ad 9 supra leviter subtus conspicue elevatis, costa supra leviter impressa subtus conspicue elevata, petiolis ad 2.5 cm. longis glabris plus minusve minute papillosis. Inflorescentia axillaris et subterminalis paniculata, ad 6(-10) cm. longa, pubescens, ramulis bracteolis brevibus  $\pm 2.5$  mm. longis et  $\pm 1$  mm. latis dense ferrugineo-pubescentibus plus minusve obovatis vel lanceolatis subtentis, pedunculis ad 1.5 cm. longis. Flores 4-5 mm. longi, canescenti (fide coll.), pubescentes, perianthii lobis 3.3 mm. longis ellipticis glanduloso-punctatis, pedicellis gracilibus pubescentibus ad 1 cm. longis. Fructus atropurpurascens (fide coll.), in sicco brunnescens, glaber, minutissime tuberculatus, oblongus, apiculatus,  $5.5 \times 2.2$  cm., pedicellis sat clavatis incrassatis curvatis ad 2.5 cm. longis 5 mm. crassis, atro-rubrescentibus striatis glabris.

HAINAN: *Wang* 35745 (TYPE fl., AA), in mixed forest, Dec. 21, 1933 (tree 7 m., fl. white; fr. black); *Lau* 25637 (fruit, AA); 27396, 28280 (AA).

*Beilschmiedia Wangii* has oblong-elliptic, membranaceous or subcoriaceous, glandular-punctate leaves, minutely papillate on the lower surface and frequently oblique. The delicate reticulation is apparent on both surfaces but less so on the upper. The rather long-pedicelled, loose, large-flowered, axillary or subterminal inflorescences are outstanding because of the persistent somewhat ferrugineous pubescent bracts at the nodes. The flowers appear to be glandular-punctate in an unusual way, the glands appearing as black dots when the epidermis is torn. The slightly curved, almost club-shaped fruiting pedicels bear oblong ( $5.5 \times 2.2$  cm.) dark purple fruit. *Lau* 28280 has more elongate inflorescences, while the leaves of the fruiting specimen, *Lau* 27396, supposedly a shrub, are larger than those of the type and appear to be infected with fungal growth simulating pubescence. Even so, there can hardly be a doubt of their belonging to *B. Wangii*. The species probably belongs in the group with *B. Roxburghiana*, but is separated from it by the persistent floral bracts subtending the branchlets of the panicles.

**Beilschmiedia macropoda**, spec. nov.

Arbor ad 20 m. alta, ramulis glabris teretibus striatis atro-rubrescentibus mox ferrugineo-maculosis. Folia opposita vel alternata, lanceolata vel oblonga (6.5-)9-12 cm. longa, (1.5-)2.5-4 cm. lata, subcoriacea, obtusa

vel obtuse subacuminata, basi cuneata, utrinque glabra, supra nitida, utrinque reticulata, penninervia, nervis ad 10 utrinque obscuris, petiolis sat gracilibus ad 2 cm. longis glabris. Inflorescentia ignota. Infructescentia axillaris, robusta, nunc ad 10 nunc ad 6 cm. longa, glabra, pedunculis robustis basi tumidis. Fructus viridis (fide coll.), in sicco pallide ferrugineus, glaber, sat lepidotus, ellipsoideus, apiculatus,  $4.5 \times 3$  cm., pedicellis breviter tumidis utrinque 1 cm. pallide ferrugineis glabris, in sicco longitudinaliter rugosis.

HAINAN: *Wang 34535* (TYPE fruit, AA; USNH), in mixed woods, Oct. 8, 1933 (tree 20 m. high; fr. green); *Wang 35098* (AA); *Liang 64329* (AA).

The above species is so striking in its fruiting characters that it is with no hesitation described as new. The large, ellipsoid fruit in dried state is rusty-brown, scaly and greatly wrinkled. The pedicel, which bears the same type of surface, is so swollen and enlarged as to appear to be a part of the fruit proper. The peduncles, whether long or short, are greatly enlarged at the base. From the description of the globular fruit by Liou (p. 106, Laurac. Chine Indoch.) the Indochinese species *B. Balansae* Lct. seems to have much the same type of surface, but no mention is made of the peculiar formation of the pedicels and peduncles. In any case, the leaves of the latter are elliptic or oval, shorter and broader accordingly and are only 5-6 nerved.

**Beilschmiedia obconica**, spec. nov.

Arbor ad 25 m. alta, ramulis ferrugineo-tomentosis mox griseo-glabrescentibus teretibus striatis brunnescentibus. Folia opposita vel subopposita, elliptica vel oblongo-elliptica, saepe obliqua, (4-)6-9(-11) cm. longa, (2-)3.5-4(-6) cm. lata, pergamentacea, breviter obtuse acuminata, basi cuneata, subtus glabra, costa excepta, subtus pubescentia, minute glanduloso-punctata, graciliter reticulata, penninervia, nervis 7-11 supra leviter subtus conspicue elevatis arcuatis pallide rubescentibus, petiolis ad 2 cm. longis brunnescentibus. Inflorescentia ignota. Infructescentia brevis ad 4 cm. longa, breviter ferrugineo-pubescentis. Fructus nigrescens, maculosus, pallide brunnescens, obconicus, minute apiculatus,  $12 \times 10$  mm., pedicellis incrassatis leviter clavatis ad 8 mm. longis brunnescentibus ferrugineo-pubescentibus.

HAINAN: *Liang 65199* (TYPE fruit, AA; NY, USNH), in shaded forest, along stream margin, Feb. 24, 1934 (tree 25 m. high or more, diam.,  $2\frac{1}{3}$  m.).

The only other species from eastern Asia with ferruginous pubescence is *B. ferruginea* Liou from Indochina, from which the above species is easily distinguished by the irregular reticulate venation, as opposed to the nearly parallel secondary venation of the latter. The obconical fruit is an unusual feature as well.

**Beilschmiedia Tsangii** Merr. in Lingnan Sci. Jour. **13**: 27. 1934.

KWANGTUNG: *Tsang 20412* (PARATYPE AA; USDA, USNH), *20588* (ISOTYPE AA; USDA), *25201*, *25282*, *28827* (AA); *Lau 2567* (AA); *Taam 141*, *214* (AA); *Tsang & Wong 2490* (CCC 14351), *2642* (CCC 14503) (USDA); *To, Tsang & Tsang 385* (CCC 12385) (USDA, USNH). HAINAN: *Liang 62053*, *62575* (AA, NY), *63278* (NY), *63362*, *63411*, *63417*, *63428* (AA, NY). INDOCHINA: *Tsang 27027*, *29122*, *29916* (AA).

The species, known only from Kwangtung and across the border in

Indochina, belongs in the group with *B. brevipaniculata*, from which it is easily distinguished by larger, less coriaceous, densely reticulate leaves, by longer inflorescences, and by larger fruit more minutely and less obviously tuberculate. Superficially, at least, it bears a resemblance to *Lauromerrillia appendiculata*, the type of the new genus described below, but it is at once distinguished by the floral structure and by the very finely reticulated leaves, the reticulation obscuring the lateral venation on the upper surface. The Liang numbers are in fruit only and, although a Kwangtung-Hainan distribution is unusual, are nevertheless a good match for the species.

### **Cryptocarya** R. Br.

The well known species of *Cryptocarya* from eastern Asia need no special treatment here. *Cryptocarya chinensis* Hemsl. and *C. densiflora* Blume, the only species of this region with trinerviate leaves, are easily distinguished from each other by size of leaves, inflorescence and fruit, which in the former is subglobose and in the latter globose-depressed. *Cryptocarya obtusifolia* Merr. stands out because of large heavily coriaceous, reddish tomentose leaves with numerous (9–11) veins, and long densely tomentose inflorescence. *Cryptocarya Maclurei* Merrill is noted for its dull greenish leaves, conspicuously glaucous below, and spherical fruit.

***Cryptocarya hainanensis*** Merrill in Philip. Jour. Sci. **21**: 343. 1922; Chun in Contr. Biol. Lab. Sci. Soc. China **15**: 5. 1925; Liou, Laurac. Chine Indoch. 100. 1932.

Inflorescentia axillaris, stricte spiciformi-paniculata, ad 8 cm. longa, breviter fulvo-tomentella, pauciflora, pedicellis ad 2.5 cm. longis gracilibus, basi bracteis lanceo-linearibus pubescentibus subtentis. Flores ad 2.5 mm. longi, pubescentes, perianthii lobis extus intusque pubescentibus.

HAINAN: Bak Sa, *Lau* 26133 (fl., AA) in thickets, woods, April 8, 1936 (tree; leaf green above; flowers deep green); *Lau* 26392 (AA); *McClure* 2107 (CCC 8707) (TYPE, fruit, M; NY, USDA); *Tsang & Fung* 630 (*L. U.* 18164) (NY, USNH); *Wang* 34511 (NY, USNH), 34358, 36231 (NY).

Certainly *Lau* 26133 represents the flowers of *C. hainanensis* Merr. The tomentose spicate inflorescence is unusual for the genus but the flower structure is typical.

***Cryptocarya concinna*** Hance in Jour. Bot. **20**: 79. 1882; Chun in Contr. Biol. Lab. Sci. Soc. **15**: 6. 1925; Liou, Laurac. Chine Indoch. 101. 1932.

KWANGTUNG: Buswell, *Levine & Tso* 6380 (M); *Levine* 150 (USDA, USNH), 3172 (USDA, USNH); *Tsang & Wong* 2173 (CCC 14574) (USDA), 2931 (CCC 14792) (USDA); *Liou* 836 (NY); *Ho* 60045 (NY); *Tsang* 25820 (AA). KWANGSI: *Liang* 70067 (AA).

This species has been for years a catch-all for specimens collected anywhere in southern China. Possibly the species is variable enough to include most of these, but many more numbers will have to be collected from intervening areas to make the fact known beyond doubt. At present we have available only the description and early Kwangtung numbers matched by Dr. F. P. Metcalf of Lingnan University with Hance's type, a flowering specimen collected by Ford in Happy Valley, Hongkong, and now in the British Museum. Since all Arnold Arboretum specimens of the genus have

been on loan since 1937, only specimens accessioned after that date are at hand for study.

Of the matching specimens cited above, nearly all have elliptic-oblong or oblong leaves, greyish green on drying, paler glaucous below with reticulation rather prominent, obtuse, subacute or rarely subacuminate, usually not more than 8 cm. long and 3 cm. broad. The fruit is black, oblong,  $2 \times 3$  cm., smooth at maturity, slightly asymmetrical at base. *Ho 60045* has slightly larger, more symmetrical leaves with obtusely acuminate apices, but the fruits are a match for the others. Here might be mentioned a closely related number, *Fung 20428* from Hainan, in post anthesis stage, with very young fruit, the perianth lobes having fallen. The plant may possibly represent a new species, but it could not be described on such incomplete material, although the densely flowered terminal or subterminal subcorymbose inflorescence is distinct, as also are the elliptical obtuse or rarely subacute leaves (3-) 6(-7)  $\times$  (2-)3 cm.

Variation within the species in this complex occurs mostly in leaf form and size. Flowers are usually fairly constant, with little variation in structure. Fruit also is constant within the species. Hence, other characters being equal, a striking difference in fruit structure seems to indicate a good species. Going on this assumption, then, we have recognized as species *C. Chingii* (*C. Laui*) and *C. Metcalfiana* from Kwangtung, Kiangsi, Chekiang, Kwangsi and Hainan, with great vegetative variation but constant fruit and flower characters. We have also *Cryptocarya Tsangii*, *C. Leiana* and *C. Merrilliana* from Hainan, and *C. lenticellata* from Kwangtung, distinct from either of the first two mentioned species in leaf or flower or fruit, but not in all three characters.

**Cryptocarya Chingii** Cheng in P'ei, in Contr. Biol. Lab. Sci. Soc. **10**: 111, fig. 17. 1936.

*Cryptocarya Laui* Merr. & Metc. in Lingnan Sci. Jour. **16**: 83. fig. 3. 1937.

KWANGTUNG: *Lau 922* (fruit, NY); *To, Tsang & Tsang 12637 & 12793* (TYPES of *C. Laui*, fl., NY, USDA, USNH); *Taam 149, 166, 180, 302, 392, 397, 958* (AA); *Tso 20337, 21002, 21168* (NY); *Tsang 21292* (NY, USDA); *Wang 2886* (NY). KIANGSI: *Lau 4029, 4036* (AA, USNH). CHEKIANG: *Ching 2055* (ISOTYPE of *C. Chingii*, fl. & young fruit, USNH). KWANGSI: ?*Ching 7039* (NY); *Steward & Cheo 853, 1154* (NY); *Wang 40673* (AA). HAINAN: *Liang 62581, 63146* (NY), *63456* (NY, USNH); *How 70438* (NY); *Lau 26313* (AA); *Wang 34383* (NY).

Although the isotype of *Cryptocarya Chingii* is a poor specimen, it is evident that it can not be separated from the Kwangtung material described as *C. Laui* by Merrill and Metcalf. This species has been determined frequently as *C. concinna* Hance. The *To, Tsang & Tsang* numbers *12637, 12793*, type material, present so great a range in leaf variation as to make them appear to be different species. However, a study of other specimens cited above shows a constancy of specific characters of flowers and fruit. The species is characterized by usually oblong (often elliptic on the same branch), obtusely acuminate, subcoriaceous leaves approximately three times as long as broad, slightly shining or dull above, paler below, bringing out the darker venation which is inconspicuous above. The young branchlets and very young leaves are covered with a fine silky pubescence

which disappears early for the most part. The axillary or subterminal, rather dense panicles, shorter than the leaves, are clothed with a close, greyish tan pubescence. Very young fruit is almost spherical but soon assumes the ellipsoid shape characteristic of the full-grown specimen. Immature fruit also has well defined longitudinal striations which disappear as it approaches maturity. Mature fruit is black, approximately  $15-17 \times 10-12$  mm., borne on somewhat enlarged verrucose or rimose pedicels.

The Hainan numbers have been included only after careful consideration. Their leaves, on the whole, are more often elliptic than oblong and perhaps less acuminate, but there seem to be no other differences. The flowers are identical. *Lau 26313* and *How 70438* show immature fruits which differ in no way from the fruit from Kwangtung in the same stage of development.

**Cryptocarya Leiana**, spec. nov.

Arbor ad 5 m. alta, ramulis gracilibus glabris, ultimis minute fulvo-pubescentibus, teretibus striatis olivaceo-brunnescentibus. Folia alternata, lanceolata vel lanceolato-elliptica, raro obovata, (4-)9-14 cm. longa, 1.5-4-5 cm. lata, subcoriacea, acuta, acuminata vel obtuse acuminata, raro retusa, basi cuneata, minute pubescens, mox glabrescens vel glabra, subtus glauca reticulataque, penninervia, nervis  $\pm 5$  supra obscuris, costa impressa, subtus elevatis, petiolis 5-10 mm. longis brunneis glabris glandulosis. Inflorescentia subterminalis vel axillaris, racemoso-paniculata, plerumque quam folia brevior, ad 6.5 cm. longa, ramulis gracilibus minute pubescentibus aliquid strictis. Flores ultimi plerumque 3 fulvo-pubescentes, 2-3 mm. longi, flavescentes, fragrantis (fide coll.), sessiles vel brevi pedicellati, perianthii lobis ovatis  $\pm 2$  mm. longis intus paullo pubescentibus. Fructus in sicco glauco-purpureo-brunnescens, glaber, ellipsoideus, apice basique leviter attenuatus,  $12 \times 7$  mm., apice perianthii tubi reliquis coronatus pedicello leviter crasso situs.

HAINAN: Mei Maan and vicinity (Ching Mai District) Kai Lun Ko, *Lei 17* (TYPE, fl. & fruit, NY; USDA, USNH), rare in thickets on village commons on dry level land in sandy soil, Sept. 25, 1932 (woody, erect 5 m. high, 12 cm. diam.; fl. yellow, fragrant).

The species is distinctive because of the small ellipsoid fruit, never more than  $12 \times 8$  mm., rough, minutely tuberculate and opaque on the surface with faint costa apparent. Seemingly these fruits are mature, although one should not overlook the possibility that they are not, in which case one might be forced to consider *C. Leiana* as an Hainan form of *C. Chingii*. The leaves are lanceolate-elliptic or oblong-elliptic, often slightly broader in the upper half, with the apex varying from rounded or retuse to obtusely acuminate, 6-13 cm. long, 3-5 cm. broad. The single branch of the type has subterminal or axillary racemose full-flowered panicles at its tip, and below, fruiting panicles bearing presumably mature fruits. The individual flower parts, stamens, etc., are on a larger scale than those of *C. Chingii*. The fruiting pedicels are only slightly swollen as opposed to much enlarged pedicels of *C. Chingii*.

**Cryptocarya Merrilliana**, spec. nov.

Arbor (vel frutex ad 2 m.) ad 12 m. alta, ramulis ultimis sparse pubescentibus et lenticellatis saepe minute glandulosis rimosis brunnescentibus mox rubescentibus griseis maculosis. Folia alternata elliptica, raro oblongo-

elliptica, 5–12 cm. longa, 2–4 cm. lata, subcoriacea, obtuse subacuminata, basi cuneata, supra glabra, subtus pubescens, junioribus utrinque adpresse sericeo-pubescentibus, utrinque plus minusve obscure reticulata, penninervia, nervis 4–5 subtus quam supra elevatioribus, petiolis ad 1 cm. longis brunnescentibus pubescentibus mox glabris et atratis, plus minusve minute glandulosis. Inflorescentia subterminalis axillarisque, racemoso-paniculata, 3–5 cm. longa, quam foliis brevior, sericeo pallide brunneo-pubescens. Flores  $\pm$  3 mm. longi perianthii lobis ovatis 1.7 mm. longis intus leviter pubescentibus, pedicellis brevibus pubescentibus. Fructus in sicco olivaceus, glaber, costatus, minute tuberculatus, ellipsoideus, apice perianthii reliquis coronatus, ad  $15 \times 9$  mm., pedicello crasso ad 2 mm. situs.

HAINAN: Kumyun, *Lau* 27635 (TYPE fl., AA), in dense woods on slope, Aug. 7, 1936 (erect shrub 2 m., diam. 3 cm.; leaf green above; fruit green); *Lau* 26075 (AA); *Chun & Tso* 44398 (fruit, NY, USNH), 43887 (NY), 44043 (NY); *Wang* 33437 (NY, USNH), 35040 (NY).

This species also is well within the limits of the "concinna" complex, and approaches *C. Chingii* in general characters. It varies in its irregular leaves, usually elliptic and more coriaceous, and in twigs minutely glandular with their pubescence persisting longer. Again, it is possible that this may eventually tie in with a broader concept of the Hainan specimens of *C. Chingii*.

**Cryptocarya lenticellata** Lecomte in Not. Syst. **2**: 333. 1913; in Fl. Gén. Indoch. **5**: 145. 1914; Liou, Laurac. Chine Indoch. 99. 1932.

KWANGTUNG: *Lau* 20219 (AA, NY, USDA, USNH).

The above species has been reduced by Nakai (Jour. Jap. Bot. **16**: 122. 1940) to *C. Konishii* Hayata & Kawakami (List Pl. Formos. 95. 1910). The species seem close, but with only a description and no authentic material from Indochina for comparison I hesitate to accept the reduction, particularly in view of the discrepancy in range. The *Lau* specimen cited by Nakai is not from the Kwangtung-Tonkin border, but from near the monastery at Ting Woo Shan. For this reason the presence of an Indo-Chinese species is very probable. Although the *Lau* number cited is similar to the material of *C. Konishii* at hand from Formosa, at the same time it matches well the description of *C. lenticellata*. The fruit of *Lau* 20219, apparently immature, is larger than that of *C. Konishii*, and less broad at the base in proportion to its length. It seems to answer more nearly the description of the fruit of *C. lenticellata*. Certainly the fruits are no match for those seen on the Formosan material from New York or Washington. The pedicels are thickly swollen, which is not the case with those of the latter. Temporarily we will keep *C. lenticellata* a distinct species and consider *Lau* 20219 a Kwangtung representative.

**Cryptocarya Metcalfiana**, spec. nov.

Arbor ad 15 m. alta, ramulis ultimis glabris striatis sparse pubescentibus angulatis brunnescentibus. Folia alternata, lanceolata vel lanceolato-oblonga, (3–)7–8(–10) cm. longa, (1.2–)2.5(–4) cm. lata, coriacea, acuta, obtusa vel breviter obtuse acuminata, basi cuneata saepe obliqua, utrinque glabra, subtus leviter glauca, supra obscure subtus leviter reticulata, penninervia, nervis 5–7, subtus quam supra elevatioribus, petiolis 1–1.5

cm. longis brunnescentibus glabrescentibus. Inflorescentia subterminalis, racemoso-paniculata, densiflora, plerumque quam folia longior, ad 10 cm. longa, ramulis ultimis breviter pallide brunneo-pubescentibus. Flores ultimi 2-3, brunneo-pubescentes, 3 mm. longi, perianthii lobis viridescenti-flavescentibus (fide coll.), extus intusque pubescentibus, pedicellis pubescentibus  $\pm$  1 mm. longis tenuibus. Fructus in sicco olivaceus, immaturus viridis (fide coll.), glaber, obscure costatus, oblongus, apice perianthii reliquis coronatus, ad 17 mm. longus, 10-11 mm. latus, pedicello crasso 2-3 mm. longo situs.

HAINAN: Chim Shan Fan Maan, Ts'uen & vicinity, Ling Shui (Ling-tui) District, *Fung* 20087 (TYPE fl., NY; USDA, USNH), growing in forest and lower slope of the mt. (tree 15 m., diam. 24 cm., flower greenish yellow); *Lau* 1259, 1742 (NY), 5831 (AA), 27399 (AA); *Liang* 63261 (fruit, NY), 62347, 63302, 66049 (NY); *Wang* 33441 (NY).

This species is near *C. concinna*, but differs in having leaves that are on the whole larger and more coriaceous, and inflorescences more densely flowered and longer than the leaves. *Lau* 27399 and *Liang* 66049, in very young fruit, bear leaves more shining and generally longer than those of the type.

***Cryptocarya Howi*, spec. nov.**

Arbor ad 16 m. alta, ramulis teretibus glabris striatis plus minusve pallide viridescenti-brunnescentibus. Folia alternata irregulariter lanceolato-ovata vel ovata vel saepe oblonga, 5-9-12(-14) cm. longa (2-)3(-5.5) cm. lata, coriacea, attenuate, acute vel obtuse acuminata, saepe obliqua et falcata, basi rotundata vel cuneata, glabra subtus conspicue glauca, penninervia, nervis 3-5 supra leviter impressis subtus conspicue elevatis, petiolis ad 1.5 cm. longis crassis glabris brunnescentibus. Inflorescentia subterminalis racemo-paniculata, congestiflora, plerumque quam folia brevior, ad 7 cm. longa, ramulis brunnescentibus pubescentibus mox glabrescentibus. Flores ultimi 2-3, breviter griseo-pubescentes, 2-3.5 mm. longi, flavo-canescens (fide coll.), sessiles vel brevi-pedicellati, perianthii lobis ellipticis  $\pm$  2 mm. extus intusque pubescentibus. Fructus niger (fide coll.), in sicco olivaceo-brunnescens, obtuse 9-costatus, oblique oblongus, apice perianthii reliquis coronatus, ad 2.5 cm. longus, ad 1.2 cm. latus, crasso pedicello situs.

HAINAN: Woods, Yaichow, *How* 70499 (TYPE fl., NY; USNH), alt. 510 m., Mar.-July, 1933 (tree 9 m.; fl. yellowish white); *Wang* 36749 (fruit, NY), 33969 (NY); *How* 70839 (NY); *How & Chun* 70132 (NY, USNH), 63302 (NY).

*Cryptocarya Howi* is similar to *C. Metcalfiana*, but the leaves are, on the whole, larger and more irregularly lanceolate-ovate or ovate, usually more rounded at the base, and very glaucous beneath, making the darker veins stand out more clearly. The branchlets have a greenish brown tinge. In leaf shape this species resembles *C. Tsangii* as well. The blades are coriaceous, elliptic or usually slightly ovate-elliptic with obtusely subacuminate or obtusely acute apices and with bases rounded to abruptly cuneate. The lower surface is glaucous at first, later more or less concolorous. The midrib is slightly impressed above and strongly elevated below. The lateral veins, 4-5 pairs, spread upward, arching slightly toward the margin, and are inconspicuous on the upper and elevated on the lower surface. The reticulations are more apparent on the lower surface.

The petioles are 1.5 cm. long. The inflorescences are 5–10 cm. longer than the leaves. The mature fruits are long-ellipsoid, black and faintly striate,  $2.5 \times 1.2$  cm. These specimens, heretofore placed under *C. cinnā*, are a far cry from the original description of that species and from the presumably authentic specimens indicated by Metcalf as a match for the type at British Museum.

HAINAN: *Tang* 423 (AA); *Lau* 1456 (NY); *Liang* 64204 (NY).

The above numbers from Hainan can be separated from *C. Howi* only by their stouter, dark brown branchlets and larger, more coriaceous leaves ( $15 \times 5.5$  cm. with petioles up to 2 cm. long). The branchlets of the inflorescence also are stouter. Lau's field label for the flowering specimen says "rare," so perhaps we have another species. Nevertheless, the congested inflorescence, the long oblong fruit and the leaf shape present similar characters to those of the type.

**Cryptocarya Tsangii** Nakai, Jour. Jap. Bot. **16**: 121. 1940.

HAINAN: *Tsang & Fung* 688 (*L. U.* 18222) (ISOTYPE, NY, USNH).

No flowering material of this species is available. From the fruiting branchlets it is apparent that a separate entity is involved. The heavily coriaceous leaves are bright brown, very shining above, dull below with the venation elevated and more apparent, and are borne on rubescent petioles. The young twigs are more or less rubescent and frequently covered with paler lenticels. The black fruit is ellipsoid, often with a very slight tendency to be obovoid, longitudinally striate, minutely tuberculate. It is a question again if this may not represent a form of *C. Metcalfiana*. It is certainly very close.

**Cryptocarya annamensis**, spec. nov.

Arbor 10(–20) m. alta, ramulis teretibus striatis nigro-rubrescentibus, ultimis ferrugineo-pubescentibus mox glabrescentibus, ad nodos complanatis. Folia alternata, oblonga vel elliptica, raro late elliptica, (6–)8–9 cm. longa, (2.5–)3(–4.5) cm. lata, coriacea, obtuse acuminata, vel obtuse acuta, basi rotundata vel obtusa, saepe obliqua, utrinque glabra, subtus glauca, supra leviter subtus conspicue reticulata, penninervia, nervis 4 supra plerumque obscuris subtus elevatis ferrugineo-pubescentibus mox glabris, petiolis 1–1.5 cm. longis probabiliter ferrugineo-pubescentibus mox griseo-pubescentibus demum glabrescentibus vel glabris. Inflorescentia axillaris et subterminalis, saepe foliosa cymoso-paniculata, quam folia brevior ad 4 cm. longa, ramulis breviter ferrugineo-tomentosis. Flores plerumque 3, intus extusque dense fulvo-pubescentes, 3 mm. longi, sessiles vel breve pedicellati, perianthii lobis ovatis 2 mm. longis. Fructus in sicco nigrescens, glaber, late subfusiformis, apice perianthii tubi reliquis coronatus, 8–10 mm. longus, ad 5 mm. latus pedicello aliquid crassato cicatricoso situs.

FRENCH INDO-CHINA: Annam: Station Agricole de Blao pro: du Haut Donai, *Poilane* 22294 (TYPE, P) alt. 800 m., April 12, 1933 (arbre de 10 m. de h. et de 0.40 m. diam., fl. non ecloses et fruits forêt); 21763 (P).

This species falls in Liou's<sup>1</sup> key in the section "fruit ovoid-oblong, not

<sup>1</sup> Liou, Laurac. Chine Indoch. 96. 1932.



longitudinally costate, with greyish inflorescences." Lecomte<sup>2</sup> mentions no species with leaves less than 10 cm. long except *C. lenticellata* Lcte., which bears costate fruit. The nearest relative of *C. annamensis* is *C. ferrea* Blume from Malaya, reported by Lecomte (l. c. 147) and Liou (l. c. 101) as occurring in Cambodia, Cochinchina and Laos. *Cryptocarya annamensis* has elliptic or elliptic-oblong leaves, obtusely acuminate to obtuse, glaucous below, 7–10 (–13) cm. long, 3–4 (–5.5) cm. broad. The lateral nerves number 4 or 5, whereas those of *C. ferrea* are 8 or 9 (–12–14). The petiole is 10–15 mm. long as opposed to 5–10 mm. long in *C. ferrea*. The inflorescence is up to 9 cm. long and densely flowered. The very young branchlets are rusty tomentose, soon becoming darkly short-pubescent, and finally glabrous and black. The fruits are small, black, ellipsoid, up to 10 m., attenuate at both ends (subfusiform). The last cited number has larger leaves but belongs to this species.

### **Lauromerrillia**, gen. nov.

Arbores. Folia opposita vel alternata, simplicia, penninervia. Ramuli plus minusve robusti, plus minusve angulati. Inflorescentiae axillares, paniculatae, exinvolucratae. Flores hermaphroditi: perianthii lobi 6, aequales tubum brevem, connati cum appendiculis glandulosis alternantes, brevibus flabelliformibus, stamina 6, introrsi, lobis oppositi, antheris 2-loculatis, staminodii 3, lobis exterioribus oppositi, 1–∞ forma magnitudine valde ludentibus quam caeteris minoribus; ovarium subglobosum stylo sat gracile.

#### **Lauromerrillia appendiculata**, spec. nov.

Arbor (4–)6–10(–20) m. alta, ramulis glabris, novellis plus minusve pubescentibus, teretibus inaequaliter striatis griseis robustis. Folia opposita vel alternata, elliptica vel obovalia, 4.5–10 cm. longa, 2–3.5 cm. lata, membranacea vel interdum subcoriacea, obtusa, obtuse acuminata, rotundata vel retusa, basi cuneata saepe attenuata, utrinque glabra, supra interdum nitida, in sicco viridescens, minute denseque glanduloso-punctata, graciliter prominenterque reticulata, penninervia, nervis lateralibus 7–9 obscuris gracilibus, costa supra leviter subtus prominenter elevata, petiolis ad 1 cm. longis glabris. Inflorescentia axillaris, paniculata, brevis, ad 2 cm. longa, pubescens, 12-flora, pedunculis 5–8 mm. longis. Flores ± 4 mm. longi, flavi (fide coll.), pubescentes, perianthii lobis 6, ± 3 mm. longis elliptico-lanceolatis membranaceis glanduloso-punctatis, tubo ± 1 mm., staminibus 6 lobis oppositis, staminodiis 3 triangularibus lobis exterioribus oppositis, 1–∞ forma magnitudine valde ludentibus quam caeteris minoribus, ovarium subglobosum, stylo sat gracile, pedicellis gracilibus pubescentibus. Fructus immaturus viridis vel nigrescens, maturus caeruleus (fide coll.), lividus, glaber, consperse minuteque tuberculatus, obovoideus, immaturus apiculatus, 1.8 × 1 cm., pedicellis sat incrassatis ad 4 mm. longis 1.5 crassis nigrescentibus glabris.

HAINAN: Chim Fung Mt., near Fong Ngau Po Village, Kan-en District, *Lau* 5434 (TYPE fl., AA), fairly common dry steep slope, sandy soil, forest, Feb. 1–28, 1935 (erect tree 9 m. high, diam. 15 cm.; flower yellow); *Lei* 818 (fruit AA, USDA, USNH); *How* 70781, (AA, USNH), 73064 (AA); *Lau* 6 (AA, USDA, USNH), 1268, 1352, 1587, 1662, 1830, 3401, 3535, 3662, 26470 (AA).

<sup>2</sup> Lcte., Fl. Gén Indoch. 5: 144. 1914.

This species is similar superficially to those in the group with *Beilschmiedia erythrophloia*, but differs sharply in its minutely tuberculate fruit with a definitely obovoid rather than ellipsoid tendency, apiculate only in the young stage, and seated on a somewhat enlarged pedicel. The largest fruits and presumably the most mature are described as blue, whereas the smaller are green or black. The leaves are membranaceous with the lateral veins almost completely obscured by the delicate, loose, raised reticulation. The greenish twigs are unevenly and coarsely striate. The flowers are rather large, 4 mm. in length, and campanulate, with six membranaceous lobes opposite which are six large stamens over 2 mm. long. The introrse anthers possess two large pores and are borne on slender filaments. In the sinus of each lobe is a small flabelliform sessile staminodium or gland. Opposite the three exterior perianth lobes are triangular, shortly stipitate staminodia. Scattered helter-skelter below, around the tube, are a few variously shaped staminodia, stipitate or sessile. The ovary is subglobose with a somewhat slender style once and a half again as long as the ovary. The flower structure does not conform in parts or number of parts to any known genus of the Lauraceae. Vegetatively the specimens fit very nicely into the genus *Beilschmiedia*. As far as the fruit is concerned, the Hainan material might possibly belong to *Beilschmiedia* or *Endiandra*. It is a question of how much latitude may be permitted when one is dealing with floral structure. In the Hainan genera studied previously (*Cinnamomum*, *Neocinnamomum*, *Litsea*, *Neolitsea*, *Actinodaphne*, and *Lindera*) there has been a remarkable consistency in the floral structure. It is only in *Cryptocarya*, *Beilschmiedia*, and *Endiandra* that a variation in number and structure is apparent.

Prof. I. W. Bailey, of the Biological Laboratories of Harvard, very kindly examined the type and pronounced it to be lauraceous in respect to the anatomy of its pollen, leaves and stem. He also states: "The six organs which alternate with the lobes of the perianth differ somewhat in form from the three staminodia but are of fundamentally similar structure. In other words, they appear to me to resemble structures that have been interpreted as staminodia in the flowers of other Lauraceae."

The genus is named in honor of Dr. E. D. Merrill, Director of the Arnold Arboretum, whose work on the flora of Hainan is outstanding.

### **Endiandra** R. Br.

**Endiandra hainanensis** Merr. & Metc., spec. nov.

Arbor ad 8 m. alta, ramulis glabris, novellis pubescentibus, minutissime glandulosis teretibus, novellis sat angulatis, striatis brunnescentibus. Folia alternata, lanceolata vel oblongo-elliptica, ad 15 cm. longa, 5 cm. lata, pergamentacea, obtusa, attenuate obtusa vel obtuse acuminata, basi cuneata, saepe obliqua, utrinque glabra, minute denseque glanduloso-punctata, utrinque dense conspicuissimeque reticulata, penninervia, nervis 6-8 supra inconspicuis subtus leviter elevatis, costa supra sat subtus conspicue elevata, petiolis 1-1.5 cm. longis glabris. Inflorescentia axillaris, paniculata, ad 6 cm. longa, glabrescens, pauciflora, pedunculis ad 1 cm. longis gracilibus

glabrescentibus mox glabris. Flores 3.5 mm. longi, glabri, perianthii lobis ovalis carnosus, staminibus 3, pseudoconnatis. Fructus in sicco purpureo-brunnescens, inconspicue costatus, glaber, attenuate oblongus, apice obtusus, ad  $3.8 \times 1.4$  cm., pedicellis incrassatis ad 5 mm. longis 2 mm. crassis griseis vel atro-rubrescentibus glabris.

HAINAN: Po-ting, *How* 72977 (TYPE fl., AA), alt. 330 m., in forested ravine, June 24, 1935 (tree 8 m., bark grey; leaf lustrous green above, paler beneath; flower pale yellow, anthers opening by valve, slightly fragrant); *Lei* 46 (fruit, AA).

The new species from China is near *E. coriacea* Merr. from the Philippines and an apparently unpublished species from Formosa, but differs from the former in having thinner leaves and longer, attenuated fruit with shorter, less enlarged pedicels, smaller flowers, and inflorescences not ferruginous tomentose. From the latter it differs in leaves more oblong than elliptic, more finely reticulate, and branchlets less robust.

### **Syndiclis** Hook. f.

***Syndiclis chinensis***, spec. nov.

Arbor 10(-12) m. alta, ramulis glabrescentibus, novellis ferrugineo-tomentellis, lenticellatis teretibus striatis brunnescentibus. Folia opposita vel alternata, ovata vel elliptica, 6-10 cm. longa, 2.5-5.5 cm. lata, coriacea, acuminata, acuta vel obtusa, saepe obliqua, utrinque glabra vel subtus glabrescentia, novellis subtus pubescentibus?, subtus glauca, minute alveolata, penninervia, nervis 3-5 et costa brunnescentibus, supra impressis subtus elevatis, petiolis ad 1.5 cm. longis brunnescentibus glabrescentibus. Inflorescentia axillaris, paniculata, ad 4 cm. longa, ferrugineo-tomentosa, pauciflora, pedunculis brevibus. Flores 1.5 mm. longi, viridescenti-flavi (fide coll.), ferrugineo-tomentosi, perianthii lobis 4 ovalibus, staminibus 4 paullo exsertis, sessilibus introrsis 2 exterioribus bi-glandularibus, staminiidiis 4 pubescentibus staminibus oppositis; ovarium ovoideum stylo attenuatum, pedicellis brevibus ad 1.5 mm. longis. Fructus illustre viridis (fide coll.), in sicco atro-rubescens, glaber, turbinatus, cicatrice oblique,  $3.5 \times 3$  cm., basi 1 cm. crassus, pedicellis pedunculis confusis incrassatis ad 4 cm. longis et 1 cm. latis ferrugineis striatis glabris.

HAINAN: Po-ting, *How* 73136 (TYPE fl., fruit, AA), alt. 480 m. in forested ravine, July 8, 1935 (tree 10 m. high, bark brown; leaf lustrous green above, paler beneath, coriaceous; flower greenish yellow; fruit lustrous green); *Wang* 34657 (AA).

The genus was set up in 1886 by Hooker f., *Icones* **16**: 1516. 1886, and *Fl. Brit. Ind.* **5**: 127. 1886, from Booth's flowering specimen from Bhotan, Himalaya. The name *Syndiclis* refers to the single valve of the anther, doubtless presumed to have been formed by the fusion of the usual two. This characteristic, plus the four perianth lobes and stamens, was the basis of separating it from *Endiandra*. *Syndiclis chinensis* differs from *S. paradoxa* Hook. f., from India in having the young branchlets ferruginous tomentose instead of white or pubescent, leaves 3-4 inches long and 2-2½ inches wide with usually 4 pairs of veins instead of 4-5 inches by 1-1½ inches with 10-12 pairs of veins, the inflorescence ferruginous tomentose (there is no mention of this condition in *S. paradoxa*), and anthers with two valves instead of one. The fruit of *S. paradoxa* is unknown. Koster-mans, *Not. Syst.* **8**: 73. 1939, has discussed the relationship of *Syndiclis*

to the genus *Potameia* Thouars from Madagascar. The only difference he finds is the single locule of *Syndiclis paradoxa*, which he contends appears as two before dehiscence, and at dehiscence becomes confluent. Having myself in other genera found various stages of confluence of valves (see Allen, Jour. Arnold Arb. **23**: 149. 1942) I am inclined to agree with Kostermans that this character is insufficient to maintain *Syndiclis* as a distinct genus. The distribution, although unusual, is not entirely unknown. For example, *Erythrophloeum* in the Leguminosae is predominantly African, with one species each from Australia, China and Indo-China. Other genera, such as *Baphia*, also a legume, and *Combretodendron* in the Lecythidaceae, occur in Africa or Madagascar with an isolated species or so in the Philippines or Malaya.

ARNOLD ARBORETUM,  
HARVARD UNIVERSITY.